

Applications Note: Simulated Weight Loss Test

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1.0 Introduction

This application note details the procedure used to determine the accuracy and reproducibility of the Mark 2 moisture Analyzer at low moisture levels using known reference weights as the simulated weight loss sample. A known percentage loss result can be attained using known reference weights as the sample weight and a known smaller reference weight removed during the test as the simulated weight loss. This procedure outlines the instrument setup and method used to perform a simulated weight loss test on the Mark 2 Moisture Analyzer.

2.0 Objective

The objective of this application note is to demonstrate the accuracy of the Mark 2 using a variety of sample sizes. These tests should initially be performed in an environment free of vibration and air currents. Line voltage to the analyzer should be reasonably constant and free from fluctuations. This test can also be used to evaluate a potential location for vibration, air currents, A/C line conditions once a baseline of accuracy has been established in a controlled environment.

3.0 Instrument Set-Up

3.1 *Model*

The Mark 2 should be the HP version equipped with the three-digit resolution (.001%) program.

3.2 *Environment*

The Mark 2 should be placed in an environment free of vibration and air currents. Line voltage to the analyzer should be reasonably constant and free from fluctuations.

3.3 *Warm-Up*

The Mark 2 should warm-up for a minimum of two hours at the selected standby temperature for the most accurate results. The reference weights should also be heated to remove any oils or moisture. This process will minimize the effects of temperature drift on the balance.

4.0 Instrument Settings

The test settings of any plastic material can be recalled for the purpose of the simulated weight loss test. Using the settings developed for the selected plastic will provide the most realistic demonstration of the expected accuracy for the selected sample size and test conditions.

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5.0 Percentage Formula

Formula:
$$\text{Calculated (\%)} = \frac{\text{Weight Loss (g)} \times 100}{\text{Initial Weight (g)}}$$

Example: Weight Loss (Removed) = .0050 g Reference Wt. = 50.0000 g

$$\text{Calculated (\%)} = \frac{.0050 \text{ g} \times 100}{50.0050 \text{ g}} = .010 \%$$

6.0 Simulated Weight Loss Test Procedure

The following step-by-step instructions are to be used to perform the simulated weight loss test:

1. Make sure the Mark 2 has been warmed up for two hours with the heat chamber closed.
2. Press the Start key.
3. Lift the heat chamber lid.
4. Place the weights necessary to equal 100% of the ideal (target) sample weight and the smaller (simulated loss) weight on the sample pan.
5. Close the heat chamber.
6. The initial weight has been captured once the display reads "TESTING". At this point, raise the chamber lid and carefully remove the smaller (simulated loss) weight using tongs or tweezers. Close the chamber lid.
7. The test will finalize once the criteria conditions have been met.
8. Record the result and repeat five (5) times.

7.0 Acceptance

The test results are acceptable if within the following specifications:

Sample Size	Mean Diff. from Calculated %	Std. Deviation
20-50 grams	.003%	.002%
50-80 grams	.002%	.001%

Appendix - Representative Examples

Generic Type	Commercial Name	Temp1 (C)	Time1 (min)	Ideal Wt. (g)	StdbY (C)	EndPt %/min)
Polyamide-N6/6	Zytel 101F	140	5.0	25	140	.02/2.0
Polycarbonate	Lexan 141-112	160	4.0	70	150	.01/2.0
Polycarbonate	Makrolon 2558	160	5.0	60	150	.01/2.0
Polyester-PBT	Valox 3001	140	5.0	70	140	.01/2.0
Polyester-PET	Rynite FR 515	130	4.0	60	130	.01/2.0